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A.D. 1911. MARCH 4. N° 5427
ALLEN'S COMPLETE SPECIFICATION

SHAEF 1

[This Drawing is a reproduction of the Original or reduced scale.]

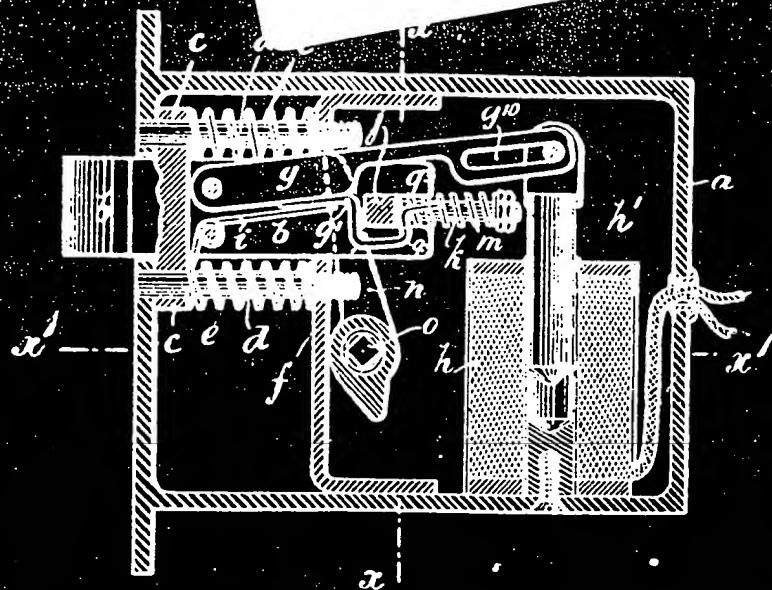


Fig. 2.

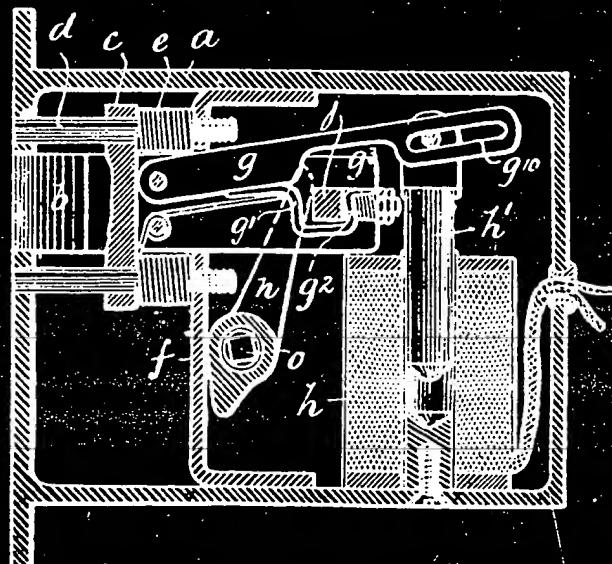


Fig. 3

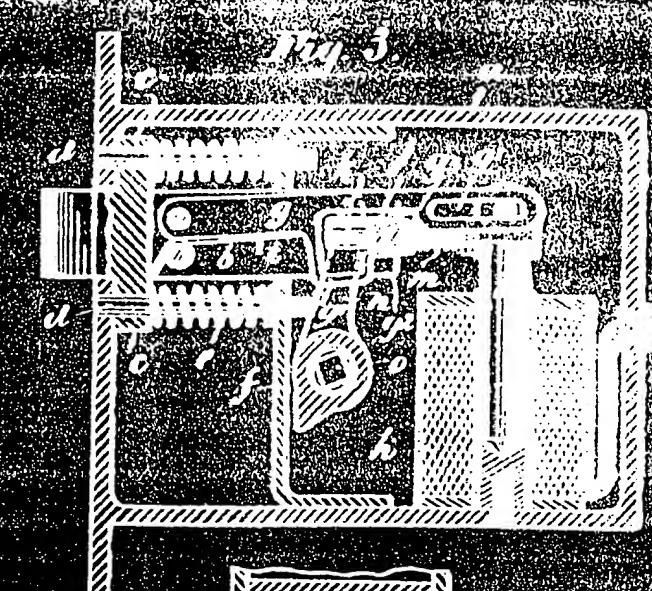


Fig. 4.

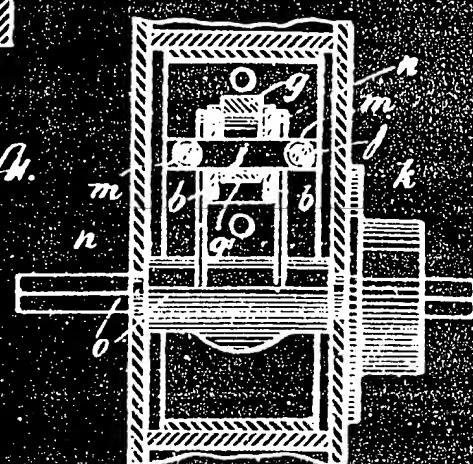
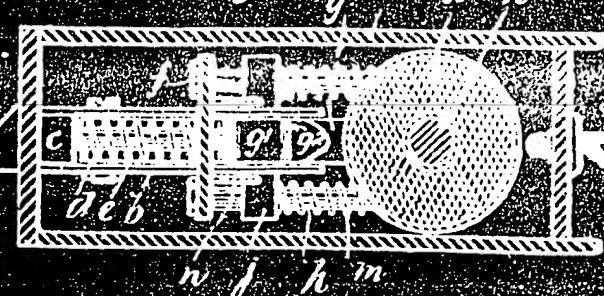


Fig. 5



A.D. 1911. MARCH 4. No. 547.
ALLEN'S COMPLETE SPECIFICATION

(3 SHEETS)
SHEET 3.

c. Fig. 6.

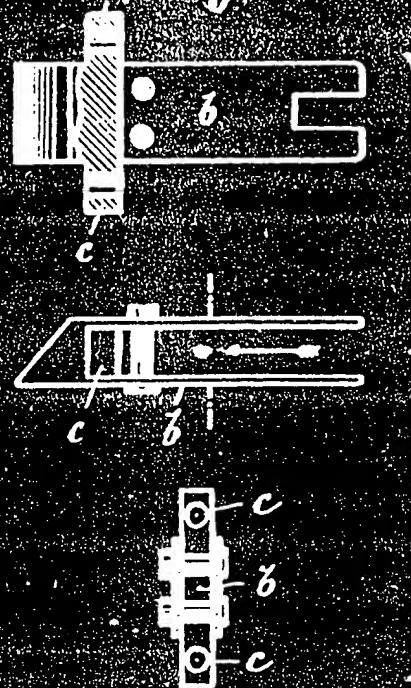


Fig. 7. g¹⁰

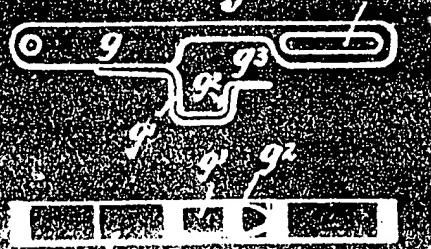


Fig. 8.



N° 5427

A.D. 1911



Date of Application, 4th Mar., 1911

Complete Specification Left, 4th Sept., 1911—Accepted, 25th Jan., 1912

PROVISIONAL SPECIFICATION.

Inventor's Statement in, and relating to, Electrically-controlled Fastenings for Railway-carriage and other Doors.

I, CHARLES RUPERT ALLEN, of 77, Newman Road, Erdington, near Birmingham, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

This invention has reference to electrically-controlled locks or fastenings for doors, and to controlling and indicator arrangements for use in connection with such fastenings, and the improvements are principally applicable to railway carriage and like vehicle doors for the purpose of preventing passengers entering or leaving the vehicle whilst in motion, as well as for preventing a passenger alighting from the wrong side of a train when the latter is standing in a station, and also for preventing a person entering or leaving a train or vehicle when stationary between authorized stopping places; but the invention may also be applied for the electrical control of door and analogous fastenings for various other purposes.

My invention, as applied to the control of the door fastenings of a railway train, provides a system wherein the locks or fastenings on both sides of the whole of the passenger compartments of the carriages in a train are controlled by master switches operated by the doors of the guards' van in such a manner that none of the carriage doors on either side can be opened except when the guards' van door on the corresponding side of the train is opened, or except when the controlling circuit is broken by a hand-operated switch situated in the guards' van or other officials' compartment.

In the case of a train fitted with an electric lighting-system, the current for controlling the door fastenings may conveniently be taken from the lighting batteries without materially increasing the load on such batteries, although, if necessary, an independent generating arrangement may be fitted to provide the necessary current to control the fastening, and also to operate an electric alarm system for indicating to the guard or other official if any one of the carriage doors is not properly closed when the train commences to move.

According to my invention, I propose to fit each of the passenger compartment doors with a lock or fastening in which the bolt is normally maintained in its locked position by suitable applied springs, whilst between this lock and the locking handle, there is provided an electro-magnetic clutch, or electro-magnetically controlled mechanism, actuated by a solenoid or electro-magnet situated in the lock casing, and so arranged that the said bolt can only be withdrawn from its handle being operated when and after the energising circuit of the lock has been broken, either by the opening of the controlling or master switch, or by disconnection with the guards' van door or otherwise, whereas when the lock handle is closed, the magnetic system operates to disengage the clutch from the handle and bolt so that if the said handle should be then again operated, it simply makes an idle movement and no motion is transmitted to the bolt, which is retained by its springs in its locked or fastened position.

One form of lock or fastening adapted for use in connection

1911.

for Railway-carriage & other Doors.

A lock or bolt assembly is shown in the drawing upon a pair of guide rods fixed in a horizontal casing. These guide rods are encircled by a coil of magnet wire which is wound against suitable abutments on a central core or plunger. A clutch lever is shown at the side of the said bolt, and is connected by a rod to a handle or spindle. There is a clutch lever which has a horizontal slot or notch in its rear end. The clutch lever is caused to move through the full range of movement of the bolt by the action of the upper end of the core or plunger of a 10 ampere electromagnet. It is provided that the bolt can make its sliding movement relative to the handle or spindle by means of a clutch lever which is caused to move between the side of the said bolt, and the side of the clutch lever. This clutch lever is caused to move in a horizontal position below the horizontal bolt, and is caused to move by the action of the bolt controlling circuit. The clutch lever and the bolt are caused to move by a suitable applied spring tending to lift 15 the bolt. The bolt is caused to move when the bolt being withdrawn when the clutch lever is moved.

The inner end of the bolt may be forked or slotted to provide a clearance for the engagement of an intermediate slide which is mounted upon and is slidably engaged with a dependent guide rod suitably fixed in the casing, and is acted upon by 20 a magnet coil or other spring which tends to keep one side of the said slide in contact with a tumbler lever or arm on the spindle of the handle or hand- 25 levers of the lock - this spindle being directed transversely through the handle or spindle. The bolt, and in such relationship to the other parts that the rotation of the handle in the unfastening direction imparts an inward movement 25 of the bolt, and the bolt being turned. The side of the slide furthest from the tumbler arm is suitably chamfered or bevelled, and is adapted, when the magnet coil is energized, to engage with a corresponding shoulder or abutment on the mechanically controlled clutch-lever.

When the controlling circuit of the lock is broken (such as by the master switch being opened or some of the guard van door) the spring of the clutch lever lifts the clutch lever, with the solenoid plunger, into a position in which the clutch lever, with the said plunger, engages behind the intermediate slide so as to establish a connection between the handle and the bolt and admit of the said bolt being withdrawn to fasten the door on the handle being turned. But when the coil 35 is energized, the plunger is drawn downwards and thereby rocks or depresses the clutch lever into a position in which its shoulder is clear of the intermediate slide, so that the connection between the handle and bolt is thus broken electrically, and the bolt is maintained in its fastened position by its springs, and if the clutch lever is turned, the tumbler arm merely moves the intermediate slide 40 without turning the bolt, and the various parts remain in these positions until the master switch is again closed or the opening of the master switch.

It is proposed that locks on both sides of a train may be wired up in series with the master switch and with the controlling switches in parallel, so that the master switch will control all the locks on both sides of 45 the train, and also the master switch will control the opening of either one of the doors of the carriage, so that the master switch will control only the carriage locks on the

train. It is proposed that the locks be connected in series with the master switch, and with a hand-operated switch or switches 50 which will be closed when the locking magnets remain energized when the doors are opened. This enables a guard to close the doors and lock the carriage locks in the event of a stoppage at any unauthorized stopping place. It is proposed that, in the event of any derange- 55 ment of the master switch or the controlling system, the clutch lever is caused to move so that it engages with the handle.

No 5427. A.D. 1911.

Impts. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

operated slide so that the lock can then be opened by means of the handle in the usual way.

As an alternative arrangement, the magnet and clutch lever may be so applied that the action is the converse to the one above described. That is to say, the energising of the solenoid operates to pull the clutch lever into position for establishing connection between the external handle and the bolt, so that (contrary to what obtains in the previously described arrangement) the lock can only be unfastened when the controlling circuit is closed.

For the purpose of indicating to a guard if any door of a train is not properly closed when the train commences to move, I may arrange in conjunction with the locking system, a bell circuit in connection with every compartment door of the train; the bell being fixed inside the guards van so that if any door or doors is or are left open inadvertently the bell commences and continues to ring until such door is properly closed. For this purpose, I 10 may arrange in connection with each carriage door, a push or other switch in suitable circuit with the bell and with a push or other switch actuated by the guards van door, but these switches have reversed actions and are arranged so that the carriage door switch breaks the bell circuit when the door is closed and only makes it when said door is open, whereas the van switch breaks the circuit 15 when the van door is opened and makes the circuit when said door is closed. Thus the bell circuit is completed only when a carriage door is opened at a time 20 when the van door is shut so that under ordinary conditions the bell only rings to indicate an improperly closed door when the train is in motion.

Dated this 3rd day of March, 1911.

25

CHARLES RUPERT ALLEN.

By Arthur Sadler,
57, Colmore Row, Birmingham,
Agent for Applicant.

COMPLETE SPECIFICATION.

30 Improvements in, and relating to, Electrically-controlled Fastenings for
Railway Carriage and other Doors.

J. CHARLES RUPERT ALLEN, now residing at 67, Slade Road, Gravelly Hill, Birmingham, and formerly of 37, Newman Road, Erdington, near Birmingham, Electrical Engineer, do hereby declare the nature of this invention and in what 35 manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to electrically-controlled locks or fastenings such as may be used in connection with electrical systems for controlling the door fastenings of railway trains wherein the locks or fastenings on both sides of the 40 compartments of a train are under the control of master-switches situated either by the doors of a guards van, or by hand, in such a manner that doors of the carriage doors on either side can be opened except when the guards van or the corresponding side of the train is opened, or except when the 45 controlling circuit is broken by the hand switch which is situated in the guards van or other officials compartment.

The improved lock or fastening is of the type wherein a spring-engaged sliding bolt or equivalent part is adapted to be withdrawn by hand-operated mechanical devices which are inoperative when the electrical controlling circuit of the 50 system is closed, but which are rendered operative on the breaking of the said circuit so that the door may then be opened; and the principal object of the

Impts. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

present invention is to provide an improved and efficient solenoid-control mechanism for connecting and disconnecting the sliding bolt to and from an external handle or operating lever, whilst another object is to provide a self-contained lock of the type referred to, which is adapted to be substituted for existing carriage locks and connected up with an electrical control without involving any structural alteration in the doors or other parts of the carriages.

Figure 1 of the accompanying drawings represents a sectional elevation of an electrically-controlled door-lock constructed in accordance with my invention and adapted for use in connection with a control system such as herein referred to. This view shows the parts in the positions they assume when a door is fastened by the lock, but the controlling circuit is broken so that the bolt can be withdrawn for opening the door when the handle of the lock is turned.

Figure 2 is a similar view to Figure 1, but shows the bolt, and parts associated therewith, in the positions they assume when the handle is turned and the bolt withdrawn.

Figure 3 is another view similar to Figure 1, but shows the position assumed by the clutch lever when the controlling circuit is closed, in addition to illustrating how the releasing handle can be turned—when the clutch lever is so positioned—without transmitting motion to the bolt which is held in its shot position by its springs.

Figure 4 is a transverse vertical section of the lock taken upon the dotted line α Figure 1, and Figure 5 is a horizontal section thereof upon the dotted line β .

Figure 6 is an elevation, plan and vertical section of the lock-bolt separately.

Figure 7 is an elevation of the clutch lever, and

Figure 8 is a plan, elevation and section of the intermediate slide which is carried by the bolt, and wherethrough movement is transmitted from the handle to the clutch lever and thence to the bolt, on the said handle being turned when the controlling circuit is broken.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

In the lock shown in Figures 1 to 8, there is arranged within a suitable casing a , a horizontally-sliding bolt b , furnished with guide pieces c , working upon a pair of guide-rods d , fixed in the said casing and disposed above and below and parallel with the said bolt. These guide rods are encircled by coiled springs e , whose inward ends thrust against suitable abutments on a fixed bearer f , inside the casing, whilst their outer ends act against the guide pieces on the bolt and normally tend to maintain the said bolt in its shot or fastening position as shown in Figures 1 and 3. Pivotally mounted upon the said bolt and adapted to slide with it, is a long arm or clutch lever g , whose rearward end is formed with a slot $g^{\prime\prime}$, which is of a length equal to the full range of movement of the bolt and is engaged by a stud on the upper end of the core or plunger $h^{\prime\prime}$ of a controlling magnet h , so that the bolt can make its sliding movement relative to the magnet without affecting the connection between the clutch lever and the plunger. The magnet is disposed in a vertical position below the horizontal bolt, and is suitably wired in the bolt-controlling circuit. The clutch lever and the solenoid plunger are both influenced by a spring i , tending to lift these parts into the position shown in Figures 1 and 2 which admits of the bolt being withdrawn when the magnet is de-energised.

The lower end of the bolt is forked or slotted to provide a clearance for the reception of an intermediate slide j , which is mounted upon and is slidable along independent guide rods k , suitably fixed in the casing, and is acted upon by separate springs m , which tend to keep one side of the said slide in contact with the tumbler levers or arms n , on the spindle o , of the handle or hand-operated turn of the lock; this spindle being directed transversely through the casing, below the bolt, and in such relationship to the other parts that the turning of the handle in the unfastening direction imparts an inward movement to the intermediate slide.

Imps. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

The lever g , is furnished on its underside, with an arm or attachment g^1 , formed so that the front part g^2 constitutes a shoulder or abutment for the slide j , whilst above the shoulder there is a gate or clearance g^3 , between the lever g , and arm g^1 , to provide for the idle movement of the slide in the event 5 of the handle being turned when the controlling magnet is energised.

Thus, when the controlling circuit of the lock is broken (such as by the master switch on the opening of a guards van door) the clutch lever g , together with the solenoid plunger, is lifted by the spring i , into the position shown in Figures 1 and 2, wherein the shouldered arm on the said lever engages behind 10 the intermediate slide so as to establish connection between the handle and the bolt and admit of the said bolt being withdrawn (as shown in Figure 2) to unfasten the door on the handle being turned. But when the coil is energised (such as by the closing of the guards-van door) the plunger is drawn downwards and thereby rocks or depresses the clutch lever into the position shown in 15 Figure 3, in which the shoulder g^2 is clear of the intermediate slide. The mechanical connection between the handle and bolt is thus broken electrically, and the said bolt is maintained in its fastened position by its springs, whereas if the handle should be turned, its tumbler arms merely move the intermediate slide, which travels idly through the gate or clearance g^3 , without transmitting 20 any movement of the bolt. And these conditions are maintained until the controlling circuit is broken.

When improved locks such as above described are applied to railway carriages, the magnets of the various locks on both sides of the train may be wired up with batteries or other source of power, and with the controlling switches, by any 25 suitable system of connections.

And with a lock constructed as described, in the event of any derangement of the electrical parts or in the controlling system, the clutch lever is automatically taken, by its spring, into the position in which it engages with the handle-operated slide, so that the lock can then be unfastened by means of the 30 handle in the usual way.

As an alternative arrangement, the magnet and clutch lever may be applied so that the action is the converse to the one above described. That is to say, the energising of the solenoid operates to pull the clutch lever into the position for establishing connection between the external handle and the bolt so that 35 (contrary to what obtains in the previously-described arrangement) the lock can only be unfastened when the controlling circuit is closed.

The said locks are adapted to be fitted in carriage or like doors in substitution of the ordinary locks or fastenings, and may be constructed so as to be readily interchangeable with such ordinary locks, but if desired, and especially when 40 fitting the electrically-controlled locks to carriages already provided with ordinary fastenings, said locks may be fitted into the frames or jambs of such doors.

I wish it to be understood that the constructional details of the lock represented in the drawings may be varied without departing from my invention, as, 45 for instance, instead of the lever of the clutch arrangement having an attached arm as shown to serve as an abutment for the tumbler-actuated slide, the said lever may be formed with a slot wherein the said slide works, and which is provided with a step or shoulder to make an abutment for the said slide whilst the part of the said slot beyond or inwards of the said shoulder is formed to constitute the gate or clearance wherethrough the slide makes its idle motion in the 50 event of the external handle being turned when the controlling circuit is closed.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

55 First:—An improved electrically-controlled lock or fastening for railway carriage and other doors, comprising a spring-influenced bolt carrying a

Impls. in Electrically-controlled Fastenings for Railway-carriage & other Doors.

solenoid-controlled clutch lever or arm, and a slide adapted ~~to~~ 5
actuated by an external handle: the said clutch lever having an abutment for
the slide, and a gate or clearance, which provide respectively for the connection
of the bolt with the handle through the slide and clutch lever, and for an idle or
inoperative movement of the said slide, according to the relative positions or
occupied by the said lever and slide as determined by the controlling solenoid,
substantially as described.

Secondly:—An electrically-controlled lock as represented in the drawings,
comprising a bolt influenced by springs tending to maintain the same in its
"shot" position, a clutch-lever or arm pivoted to the bolt and connected with 10
the plunger of a controlling magnet, a spring acting to lift the lever and plunger
and a shoulder or abutment for the said slide, so arranged that when the said
lever is held in one position by the action of the magnet, the slide may be
moved through a gate or clearance without affecting the bolt when the operating 15
handle is turned, whereas when the said magnet is de-energised, the abutment
is brought into engagement with the slide and connection is established between
the said bolt and operating handle, all for the purposes as herein set forth.

Dated this 2nd day of September, 1911.

CHARLES RUPERT ALLEN. 20

By Arthur Sadler,
57, Colmore Row, Birmingham,
Agent for the Applicant.

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